



Preliminary Mustang Electronic Interface Specification
Rev 1.0
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1. Change Log

Revision	Description	Editor
1.0	Specification Release	AND



2. Introduction

This document provides the electrical operating requirements for the Mustang Ethernet Solution.



3. Mustang Power Consumption

The Mustang operates in either a Powered Ethernet Configuration OR a Host Powered Configuration.

The Mustang's onboard circuitry requires a maximum of 300mA @ 3.3v using 10/100 Auto-Negotiation Ethernet mode.

In Powered Ethernet Configuration, the Mustang can supply upto 100mA @ 3.3v to the attached Motherboard.

4. Mustang Interface Bus Table

The Mustang Interface Bus is provided via two 1x20 0.050” stacking headers. The following tables define the signals and their functions.

The DIR (direction) column states that an “O” is an output signal from the Mustang.

The DIR (direction) column states that an “I” is an input signal to the Mustang.

The DIR (direction) column states that an “I/O” is a bidirectional signal.

4.1. Mustang Interface Connector J7

Pin#	Signal	DIR	Description	Ratings
1	RCON#	I	The serial Flash programming mode is entered by asserting the RCON pin (with the TEST pin negated) as the chip comes out of reset. During this mode, the EzPort has access to the Flash memory which can be programmed from an external device. If pin is tristated on user side then pull-up on Mustang side will keep pin high	0-3.3V
2	RX0	I	UART0: Receiver serial data inputs for the UART modules. Data is received on this pin LSB first. When the UART clock is stopped for power-down mode, any transition on this pin restarts it.	-12V-+12V
3	RTS0	O	UART0: Automatic request-to-send outputs from the UART modules.	-12V-+12V
4	TX0	O	UART0: Transmitter serial data outputs for the UART modules. The output is held high (mark condition) when the transmitter is disabled, idle, or in the local loopback mode. Data is shifted out, LSB first, on this pin at the falling edge of the serial clock source.	-12V-+12V
5	CTS0	I	UART0: Indicate to the UART modules that they can begin data transmission.	-12V-+12V
6	DGND	PWR	GND Pin	0V
7	TX1	O	UART1: Transmitter serial data outputs for the UART modules. The output is held high (mark condition) when the transmitter is disabled, idle, or in the local loopback mode. Data is shifted out, LSB first, on this pin at the falling edge of the serial clock source.	-12V-+12V
8	RX1	I	UART1: Receiver serial data inputs for the UART modules. Data is received on this pin LSB first. When the UART clock is stopped for power-down mode, any transition on this pin restarts it.	-12V-+12V
9	CTS1	I	UART1: Indicate to the UART modules that they can begin data transmission.	-12V-+12V
10	RTS1	O	UART1: Automatic request-to-send outputs from the UART modules.	-12V-+12V
11	DGND	PWR	GND Pin	0V
12	CS0	O	Synchronous Peripheral Chip Selects: QSPI peripheral chip selects that can be programmed to be active high or low	0-3.3V
13	CS1	O	Synchronous Peripheral Chip Selects: QSPI peripheral chip selects that can be programmed to be active high or low	0-3.3V
14	CS2	O	Synchronous Peripheral Chip Selects: QSPI peripheral chip selects that can be programmed to be active high or low	0-3.3V
15	CS3	O	Synchronous Peripheral Chip Selects: QSPI peripheral chip selects that can be programmed to be active high or low	0-3.3V
16	DIN	I	QSPI Synchronous Serial Data Input: Provides the serial data to the QSPI and can be programmed to be sampled on the rising or falling edge of SCLK.	0-3.3V
17	DOUT	O	QSPI Synchronous Serial Data Output: Provides the serial data from the QSPI and can be programmed to be driven on the rising or falling edge of SCLK.	0-3.3V
18	DGND	PWR	GND Pin	0V
19	SCLK	O	Provides the serial clock from the QSPI. The polarity and phase of SCLK are programmable.	0-3.3V
20	DGND	PWR	GND Pin	0V

4.2. Mustang Interface Connector J6

Pin#	Signal	DIR	Description	Ratings
1	DGND	PWR	GND Pin	0V
2	SDA	I/O	Open-drain signal that serves as the data input/output for the I2C interface.	0-3.3V
3	SCL	I/O	Open-drain clock signal for the for the I2C interface. Either it is driven by the I2C module when the bus is in master mode or it becomes the clock input when the I2C is in slave mode.	0-3.3V
4	DGND	PWR	GND Pin	0V
5	+3.3	PWR	Power Pin used to supply the Mustang PCB instead of POE	3.3V
6	+3.3	PWR	Power Pin used to supply the Mustang PCB instead of POE	3.3V
7	+3.3	PWR	Power Pin used to supply the Mustang PCB instead of POE	3.3V
8	GPIO0	I/O	General Purpose I/O for User	0-3.3V
9	GPIO1	I/O	General Purpose I/O for User	0-3.3V
10	GPIO2	I/O	General Purpose I/O for User	0-3.3V
11	GPIO3	I/O	General Purpose I/O for User	0-3.3V
12	GPIO7	I/O	General Purpose I/O for User	0-3.3V
13	GPIO6	I/O	General Purpose I/O for User	0-3.3V
14	GPIO5	I/O	General Purpose I/O for User	0-3.3V
15	GPIO4	I/O	General Purpose I/O for User	0-3.3V
16	DGND	PWR	GND Pin	0V
17	CTS2	I	UART2: Indicate to the UART modules that they can begin data transmission	0-3.3V
18	RTS2	O	UART2: Automatic request-to-send outputs from the UART modules. This signal can also be configured to be asserted and negated as a function of the RxFIFO level	0-3.3V
19	RX2	I	UART2: Receiver serial data inputs for the UART modules. Data is received on this pin LSB first. When the UART clock is stopped for power-down mode, any transition on this pin restarts it.	0-3.3V
20	TX2	O	UART2: Transmitter serial data outputs for the UART modules. The output is held high (mark condition) when the transmitter is disabled, idle, or in the local loopback mode. Data is shifted out, LSB first, on this pin at the falling edge of the serial clock source.	0-3.3V

5. Ethernet Interface

Fast Ethernet Controller (FEC)

- 10/100 BaseT/TX capability, half duplex or full duplex
- On-chip transmit and receive FIFOs
- Built-in dedicated DMA controller
- Memory-based flexible descriptor rings
- On-chip Ethernet Transceiver (EPHY)
- Digital adaptive equalization
- Supports auto-negotiation
- Baseline wander correction
- Full-/Half-duplex support in all modes
- Loopback modes
- Far-end fault detect
- Supports MDIO preamble suppression
- Jumbo packet
- 2 On-Connector LEDs for status: ACDLED, SPDLED
- 5 modes of operation
 - Power down/initialization
 - Auto-negotiate
 - 10BASE-T
 - 100BASE-TX
 - Low-power

6. UART Interface

Three Universal Asynchronous/synchronous Receiver Transmitters (UARTs)

- 16-bit divider for clock generation
- Interrupt control logic
- Maskable interrupts
- DMA support
- Data formats can be 5, 6, 7 or 8 bits with even, odd or no parity
- Up to 2 stop bits in 1/16 increments
- Error-detection capabilities
- Modem support includes request-to-send (URTS) and clear-to-send (UCTS) lines for two
- 2 UARTs are connected through a RS232 Transceiver, the remaining is used for TTL communication

7. QSPI Interface

Queued Serial Peripheral Interface (QSPI)

- Full-duplex, three-wire synchronous transfers
- Up to four chip selects available
- Master mode operation only
- Programmable master bit rates
- Up to 16 pre-programmed transfers

8. I2C Interface

I2C Module

- Interchip bus interface for EEPROMs, LCD controllers, A/D converters, and keypads
- Fully compatible with industry-standard I2C bus
- Master or slave modes support multiple masters
- Automatic interrupt generation with programmable level

9. Environmental and Voltage Specifications

Parameter	Mustang
Microprocessor	32-bit MCF5223 microcontroller @ 60MHz
Flash Memory	256 Kbytes
Data SRAM	32 Kbytes
UARTs	Three universal asynchronous/synchronous receiver/transmitters (UARTs)
General Purpose I/O	8 Parallel Digital I/O Lines
Serial Ports	-1 Inter-integrated circuit (I2C™) bus controller -1 Queued serial peripheral interface (QSPI) module
Ethernet Interface	10/100 BaseT/TX capability, half duplex or full duplex
Real Time Clock	YES
Watchdog/Supervisor	Programmable software watchdog timer
Power	Jumper Selectable: Power can be supplied via a standard POE injector 48V via CAT5 cable or Power can be supplied via Off Board Connectors @ 3.3V with reference to DGND
Operating Temperature	0 to 70deg C
Humidity	5% to 95%, noncondensing
Connectors	2 Off Board Signal & Power Headers 1x20 .050" pitch
Board Size	2.500" x 1.750" x 0.858" (including stacking receptacle to motherboard)
Programming Port	Test access/debug port (JTAG, BDM)

10. EMC Certification

CE Class B Pending Certification